
New Species and Notes on the Natural History of *Markea* (Solanaceae) from Colombia and Ecuador

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ABSTRACT. Three new species of *Markea*, *M. antioquiensis*, *M. epifita*, and *M. pilosa*, are described, having been discovered as a result of revision of material for the *Checklist of the Vascular Plants of Ecuador*. The relationships of these new taxa to the previously described Colombian endemic *Markea lopezii* Hunziker and the recently described *M. spruceana* Hunziker, and the status of the genus *Markea* s. str., are discussed. An amplified description is provided for *M. spruceana* with notes on its natural history. The three new taxa are illustrated, and a distribution map with all four taxa is provided.

In the course of preparing the treatment of the Solanaceae for the *Checklist of the Vascular Plants of Ecuador* (Jørgensen & León Y. (editors), in prep.), several unusual specimens of epiphytic Solanaceae were encountered. I have noted that these specimens were in existence (Knapp et al., 1997; noted without names or citations), but have not until now had enough material to permit complete species descriptions. Recent collecting in the middle elevations of both Andean slopes in Ecuador has resulted in more complete material.

All of the taxa described here are allied with *Markea lopezii* Hunziker of Andean Colombia, sharing with it membranous leaves often with trichomes on both surfaces, elongate inflorescences, tubular funnelform corollas, winged pedicel apices, and large, membranous calyx lobes. *Markea lopezii* was treated as *taxon incertae sedis* in Knapp et al. (1997), and its true relationships are not clear. In the cladistic analysis in Knapp et al. (1997), it was the sister taxon to the genus *Solandra*, due in large part to its possession of large, orange flowers and to the large amount of missing data for it (and its relative *M. aff. lopezii*, described recently as *M. spruceana* Hunziker) in the data matrix. Missing data can seriously affect the placement of taxa in cladistic analyses, so the placement of *M. lopezii* and *M. spruceana* should be treated with caution. *Markea lopezii*, *M. spruceana*, plus the species described here clearly form a natural group, but whether they in fact represent a new genus allied

to *Markea* awaits analysis of further collections of both flowering and fruiting material.

Current generic limits in *Markea* are unclear, with several genera having been split from it (e.g., *Hawkesiophyton* Hunziker and *Schultesianthus* Hunziker; see Hunziker, 1979), and with the genus being defined in its traditional sense on the basis of its strictly basifixed anthers, imbricate or cochlear imbrication, and often lacinate calyx lobes (Hunziker, 1979), all of which can be variable in the taxa concerned (see Knapp et al., 1997). Knapp et al. (1997) identified a clade with several seed-based synapomorphies consisting of *Markea* in the traditional sense plus the segregate genus *Hawkesiophyton*. The seeds are not known from *M. lopezii* or from two of the four species treated here. Hunziker (1997), in describing *M. spruceana*, noted that fruit and seeds were not known. As I have on loan to me from Ecuadorian herbaria several specimens of this species in fruit, I provide a complete description of this little known taxon here (also see species discussion). The fruit and seeds of *Markea* s. str. (as defined in Knapp et al., 1997) are distinctive: the fruit is a berry with thin, chartaceous pericarp that dries translucent, and the seeds are pale tan or orange with elongate, rectangular testal cells. Pollen of *Markea* s. str. is quite diverse, with three main pollen types being present in the genus (Persson et al., 1994). The pollen of *M. lopezii* with its spiny supracteal processes is completely anomalous in the tribe Juanulloae and may be related to pollination syndrome (see Ferguson & Pearce, 1986). Hunziker's (1997) amplified concept of *M. lopezii* included taxa with and without what he calls "equinada" (echinate: more correctly the tectum bears spiny supracteal processes; truly echinate pollen is not found in the Solanaceae) exine, a result that needs confirmation and documentation. Preliminary examination of the pollen of two of the new species described here, *M. antioquiensis* and *M. pilosa*, indicates that pollen of *M. antioquiensis* is superficially similar to the *Markea sessiliflora* type and that of *M. pilosa* similar to the *Markea camponoti* type (pollen types sensu Persson et al.,

1994), but further studies are necessary (Persson, pers. comm.).

It is clear that the genus *Markea* is in dire need of a monograph based on detailed field observations and new collections, as so few specimens exist and detailed morphological study will require more than a single flower per sheet. I have chosen to describe these taxa in the genus *Markea* rather than erecting a new genus because these decisions will require intensive, field-based work. In order to stimulate further collecting and study of these interesting and seemingly relatively rare species, and so that some of the names can be used in the *Checklist of the Vascular Plants of Ecuador*, they are described here.

Markea antioquiensis S. Knapp, sp. nov. TYPE: Colombia. Antioquia: Municipio Frontino, corregimiento Nutibara, cuenca alta del Río Cuevas, 1780 m, 23 Sep. 1987, *Sánchez et al.* 1559 (holotype, MEDEL; isotype, NY). Figure 1a, b.

Species *M. lopezii* Hunziker affinis, sed foliis maioribus basi truncatis vel rotundatis, glabris, calycis lobis magnis valde membranaceis, corolla eburnea lobis pupureis, differt.

Epiphytic shrub, hemiepiphytic liana or small treelet, to 2 m; stems fleshy and flexible, glabrous; older stems with thin, papery bark, drying a pale orange green color. Leaves apparently verticillate in whorls of ca. 6, elliptic to ovate, (4)10–25 × (8)10–45 cm, glabrous adaxially, minutely papillate abaxially with tiny glandular (?) trichomes ca. 0.02 mm long, drying brownish; major veins 6–7 pairs, drying brown abaxially; base truncate to rounded; apex acute, somewhat acuminate at the very tip; petiole 1.5–6 cm long, glabrous. Inflorescence an axillary raceme-like cyme, 4–10 cm long, usually bearing 4–10 flowers, the axis unbranched, glabrous or with a few scattered simple uniseriate trichomes ca. 1 mm long composed of 2–3 cells, these denser distally, each flower with 2 associated linear, stipule-like bracts 0.7–1 cm long, these sparsely pubescent with simple, uniseriate trichomes, the bracts soon deciduous. Buds elongate, corolla aestivation cochlear. Flowers with the calyx lobes valvate in bud, soon free in the distal half, the sutures winged onto the pedicel, divided ca. ½ way to the base at anthesis, the lobes elliptic, 1.5–3 × 5–7 cm, white or cream, membranous and expanded with the venation prominent, papillate with trichomes like those of the leaves, the tips rounded with a tiny apical point; pedicel 1–1.5 cm long, papillate like the calyx, winged at the apex from

the calyx lobe sutures; corolla 7–9 cm long, funnelform, abruptly widening ca. 1 cm from the base and then gradually widening to the lobes, slightly more expanded distally, cream with reddish purple lobes, the tube 6–8 cm, purple at the base, the lobes 5, 1–1.5 × 1–2 cm, rounded, glabrous; filaments inserted ca. 1.2 cm from the base of the corolla tube, 2.5–3 cm long, with a few (i.e., ca. 4) uniseriate trichomes at the point of insertion, otherwise glabrous; anthers elongate, 1.8–2.3 cm × 1.5 mm, basifixed; ovary conical, glabrous, with a large, purple disk; style 4.5–5 cm long, abruptly broadening to the capitate stigma, glabrous. Fruit an elliptic berry, 3.5–4 × ca. 2 cm, green or yellowish green when ripe, the pericarp drying thin and papery, translucent; seeds ca. 100, rectangular, 3–3.5 × 1.5–2 mm, orangish yellow, the surfaces with square to rectangular pits, the hilum at one end.

Distribution. In premontane forests in northwestern Colombia on the western slopes of the Cordillera Occidental, in the department of Antioquia, at 1300–2000 m (Fig. 2).

Markea antioquiensis has been annotated as belonging to the family Gentianaceae, due probably to its large, thick leaves and showy flowers (also see below for *M. pilosa*). It is clearly a member of the genus *Markea* s. str., sharing with other members of the genus thin-walled berries filled with rectangular, orangish seeds. The calyx lobes in *M. antioquiensis* are the largest relative to the flower of any described species of *Markea*, and are striking in their thin and membranous texture. All parts of the plant, with the exception of the adaxial leaf surfaces, are sparsely covered with minute papillate trichomes, which dry a dark reddish brown. These sorts of trichomes are common in the genus, but are usually mixed with larger, simple uniseriate trichomes. Hunziker (1997) reported that they are glandular, but I have seen no obvious secretions.

Markea antioquiensis is most similar to *M. pilosa* of northern coastal Ecuador and adjacent Colombia. It shares with that species large, thick leaves with variously truncate bases, small stipule-like bracts subtending each flower, and extremely large membranous calyx lobes which invest the flower and fruit. It differs from that species in its consistently glabrous leaves, inflorescence axis with only a few scattered trichomes, and relatively larger calyx lobes.

The specific epithet refers to the province of collection, Antioquia.

Paratypes. COLOMBIA. **Antioquia:** Municipio Urrao, Parque Nacional Natural Las Orquideas, sector Calles,

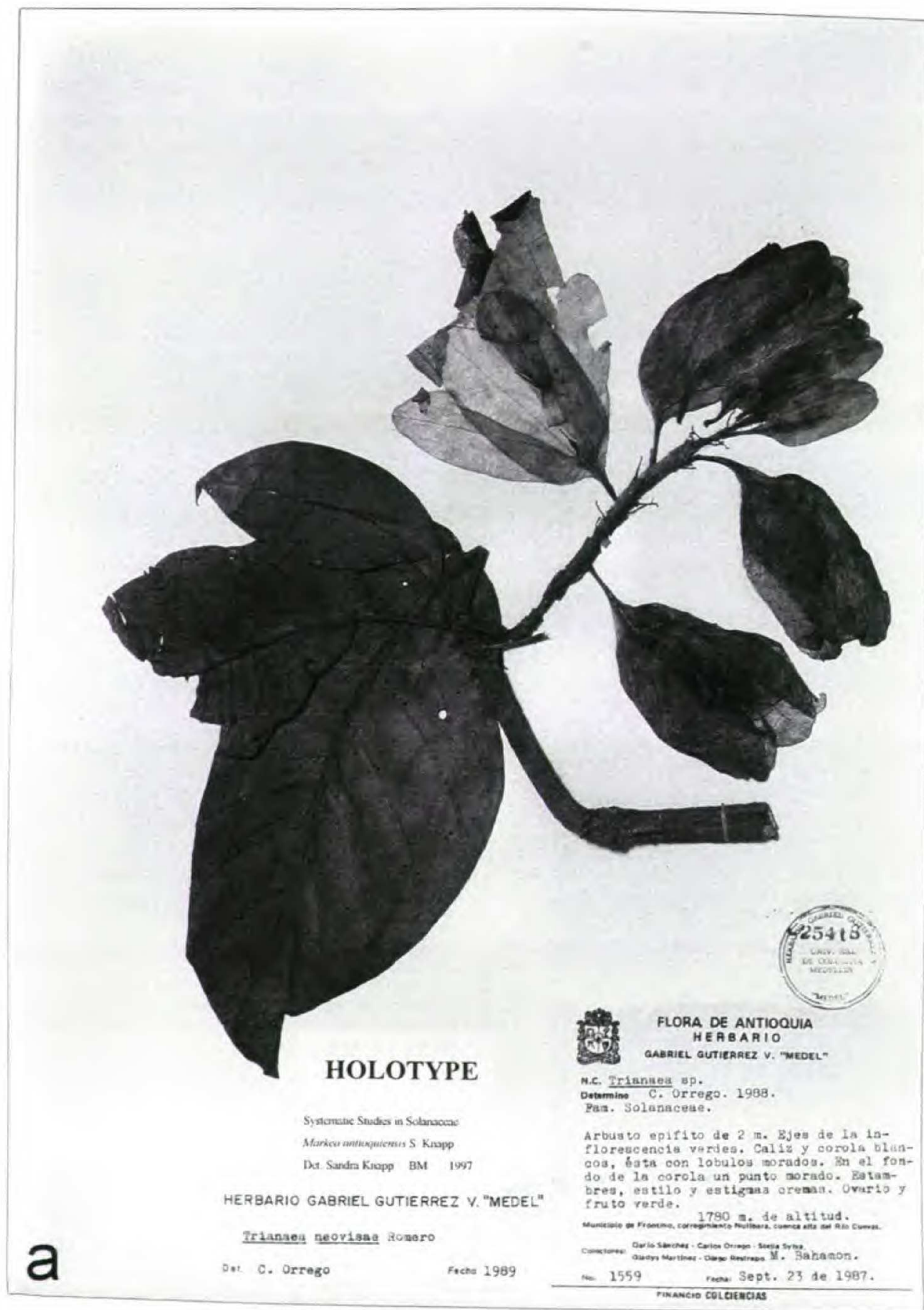


Figure 1. *Markea antioquiensis* S. Knapp.—a. Holotype, Sánchez et al. 1559 (MEDEL).—b. Isotype, Sánchez et al. 1559 (NY).

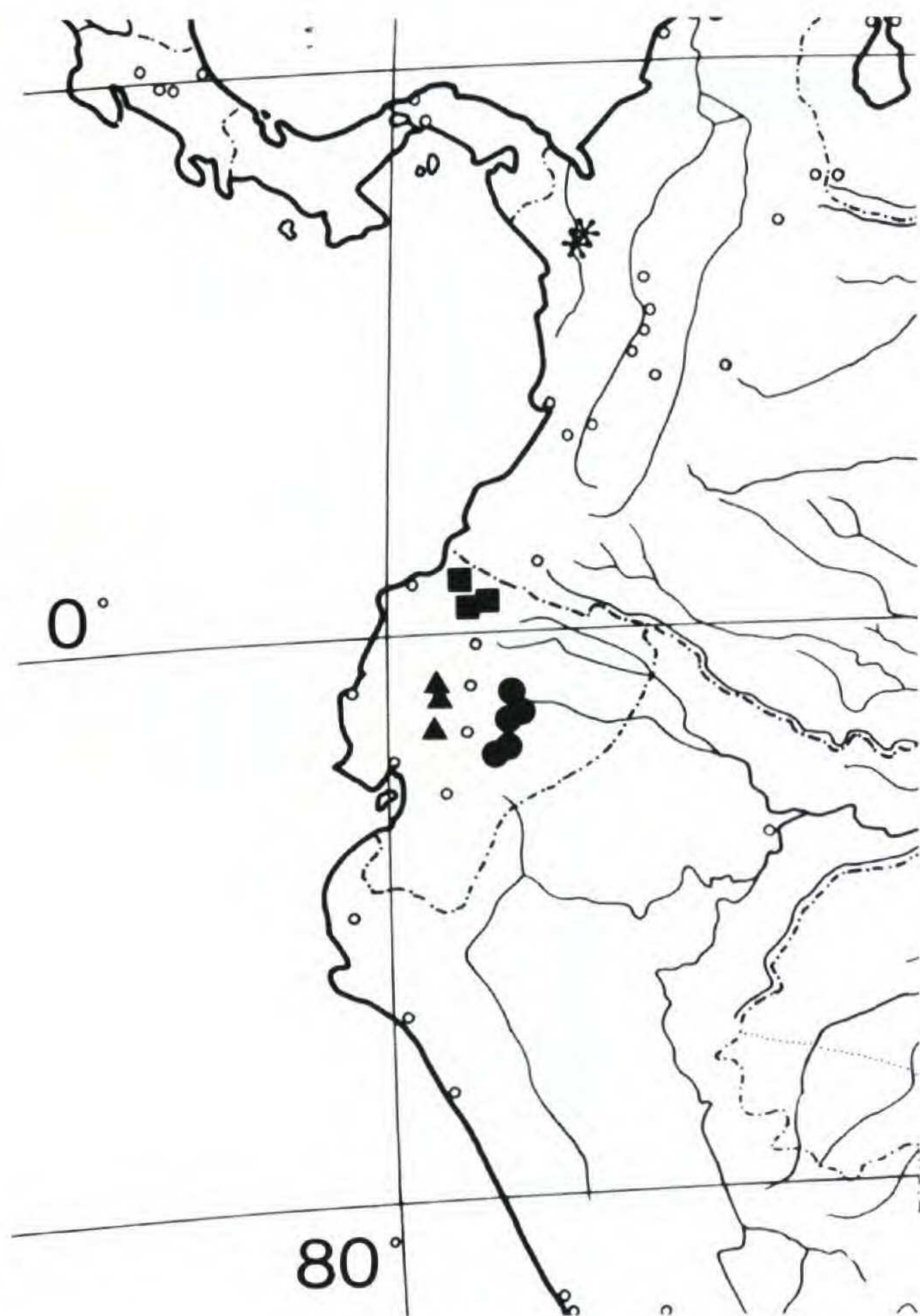


Figure 2. Distribution of *M. antioquiensis* (asterisks), *M. epifita* (circles), *M. pilosa* (squares), and *M. spruceana* (triangles).

margen izquierda Quebrada El Guaguo y margen derecho del Río Calles, 1350–1450 m, 6°32'N, 6 July 1991, *Cogollo et al.* 5019 (MO); Municipio Frontino, region of Murri, ca. 13 road km from Nutibara, NW of road, 2000 m, 6°40'N, 76°20'W, 10 Dec. 1988, *McPherson* 13420 (MO, NY); Municipio Frontino, corregimiento Nutibara, cuenca alta del Río Cuevas, 1900 m, 17 Apr. 1987, *Sánchez et al.* 1263, 1264 (MEDEL, MO).

***Markea epifita* S. Knapp, sp. nov.** TYPE: Ecuador. Napo: Canton Archidona, carretera Hollín–Loreto, km 25, sector Challua Yacu, faldas al S de Volcán Sumaco, 1200 m, 1°45'S, 77°38'W, *Cerón & Hurtado* 6534 (holotype, QCNE; isotypes, MO not seen, NY). Figure 3a, b.

Species *M. lopezii* Hunziker affinis, sed foliis ut videtur verticillatis, floribus viridi-eburneis purpureo-maculatis, antheris inclusis, pedicellis alatis, differt.

Epiphytic liana, adhering to trunks by roots; stems coarsely pubescent with simple uniseriate trichomes ca. 0.5 mm long, giving the younger stems a warty look; older stems with papery, peeling bark. Leaves apparently verticillate in whorls of ca. 6, borne only at the tips of branches, obovate, 6–12 × 11–25 cm, pubescent on both surfaces with simple uniseriate trichomes ca. 0.5 mm long, com-

posed of 2–4 cells, the trichomes stiffer, more yellowish and denser along the veins abaxially; major veins 4–5 pairs, drying dark brown; base attenuate; apex acute to acuminate; petiole 1–5 cm long, pubescent with stiff trichomes like those of the leaf undersides. Inflorescence an axillary raceme-like cyme, simple, length not known, apparently bearing a single flower, but with the scars of several more along its length, densely pubescent with simple, uniseriate trichomes like those of the stems. Buds not known. Flowers with the calyx lobes valvate in bud, the sutures winged onto the pedicel, divided nearly to the base at anthesis, the lobes long-triangular with an acuminate tip, densely pubescent abaxially with simple uniseriate trichomes 0.5–1 mm long, adaxially similar but also with small brownish papillate trichomes; corolla 10–11 cm long, tubular funnelform, gradually widening from the base, cream or green with lines or blotches of purple in the throat, the tube 7.5–8 cm, the lobes 5, ca. 2 × 2.5 cm, purple or violet, glabrous or with a few minute trichomes along the veins; filaments inserted ca. 1 cm from the base of the corolla tube, 2–5 cm long, glabrous at point of insertion; anthers elongate, 1.6–2.7 cm long, basifixed; style 5.5–6 cm long, glabrous except for a few simple uniseriate trichomes ca. 0.5 mm long at the very base; stigma clavate, ca. 0.8 mm long. Fruit not known.

Distribution. On the eastern slopes of the Andes in central Ecuador in premontane forest from 1000 to 1500 m (Fig. 2).

Markea epifita is clearly related to *M. lopezii* of Colombia, sharing with it the characters mentioned in the introduction in addition to the apparently elongate, possibly single-flowered inflorescence. Some of the specimens cited by Hunziker (1997) as belonging to *M. lopezii* may in fact be this taxon. The pubescence of the leaves and stems is similar, but *M. lopezii* does not have the apparently verticillate leaves of *M. epifita*. These leaves of *M. epifita* (and in all the species described here) are not strictly verticillate, but instead probably result from a concaulescence of nodes and internodes, a phenomenon very common in the Solanaceae (Danert, 1958). Exactly where the inflorescence arises in *M. epifita* is not clear, as none of the specimens I have seen has an intact inflorescence (see Fig. 2), but it is probably axillary as in the rest of the genus. It appears to be extremely long, as is the inflorescence axis of *M. lopezii*. In addition to the leaf differences, *M. epifita* differs from *M. lopezii* in its included anthers, cream or green flowers with purple blotches, and the winged pedicel apices.



Figure 3. *Markea epifita* S. Knapp.—a. Holotype, Cerón & Hurtado 6534 (QCNE).—b. Palacios et al. 123 (QCNE).

The epithet, the Spanish noun meaning epiphyte, refers to the epiphytic habit of this, and all other, species of *Markea*.

Paratypes. ECUADOR. **Napo:** Canton El Chaco, Proyecto Hidroeléctrico Coca, punto ST3, margen derecha del Río Quijos, ca. 10 km al S de Reventador, 1500 m, 0°11'S, 77°39'W, 3–5 Oct. 1990, *Palacios 5893* (MO, NY, QCNE); Canton Archidona, camino a Guagua Sumaco–Pacto, 1400 m, 0°44'S, 77°36'W, 25 Nov. 1992, *Palacios 10623* (QCNE). **Pastaza:** Road Veracruz (Indillana)–Canelos, 25 June 1968, *Lugo S. 75* (MO); 5 km al NE de Mera, carretera al Río Ansu, 1200 m, 1°26'S, 78°06'W, 13–16 Mar. 1985, *Palacios et al. 123* (MO, NY, QCNE); Shell, Río Pindo, 1050 m, 1°29'S, 78°04'W, 18 Aug. 1992, *Palacios 10380* (QCNE).

***Markea pilosa* S. Knapp, sp. nov.** TYPE: Ecuador. Carchí: Canton Tulcan, Parroquia Tobar Donoso, Reserva Indígena Awá, centro El Baboso, 1800 m, 0°53'N, 78°25'W, 17–27 Aug. 1992, *Tipaz et al. 1907* (holotype, QCNE; isotype, MO not seen). Figure 4a, b.

Species *M. lopezii* Hunziker affinis, sed foliis maioribus basi truncatis vel cordatis, trichomatibus longioribus, calycis lobis magnis membranaceis, corolla rubella, differt.

Epiphytic or terrestrial shrub, to 1–2 m with adventitious roots adhering to tree trunks; stems fleshy and flexible, pubescent with uniseriate trichomes when young, later glabrescent; older stems with thin, papery bark. Leaves apparently verticillate in whorls of ca. 6, elliptic to ovate, 9–30 × 12–35 cm, densely pubescent adaxially with simple, uniseriate trichomes 1–3 mm long, composed of 4–6 cells, drying white, abaxially pubescent with simple uniseriate trichomes 1–4 mm long, composed of 4–7 cells, drying transparent and apparently stiffer than those of the adaxial surface, often deciduous on older leaves; major veins 6–7 pairs, drying yellow abaxially; base truncate to cordate; apex acute and with an elongate acumen to ca. 1 cm; petiole 2.5–6 cm long, pubescent with simple uniseriate trichomes like those of the leaves. Inflorescence an axillary raceme-like cyme, 2–5 cm long, usually bearing 4–5 flowers, the axis occasionally branched, densely pubescent with simple uniseriate trichomes 1–5 mm long, composed of 4–6 cells, each flower with 2 associated linear, stipule-like bracts 0.7–1 cm long, these densely pubescent with simple, uniseriate trichomes as the rest of the inflorescence, the bracts hidden among the trichomes of the inflorescence and soon deciduous. Buds elongate, corolla aestivation cochlear. Flowers with the calyx lobes valvate in bud, the sutures winged onto the pedicel, divided ca. ½ way to the base at anthesis, the lobes lanceolate to elliptic, 1.5–2 × 4–5(–8) cm, reddish or green, mem-

branous and expanded with the venation prominent, densely pubescent with trichomes like those of the inflorescence axis, these densest along the margins, the tips rounded; pedicel 1–1.5 cm long, pubescent like the calyx, winged at the apex from the calyx lobe sutures; corolla 7–9 cm long, funnel-form, abruptly widening ca. 1 cm from the base and then gradually widening to the lobes, slightly more expanded distally, green or reddish purple, the tube 6–8 cm, the lobes 5, 1–1.5 × 1–2 cm, rounded, externally sparsely pubescent along the veins, internally glabrous; filaments inserted ca. 1 cm from the base of the corolla tube, 2.5–3 cm long, densely pubescent at the point of insertion, otherwise glabrous; anthers elongate, 1–2 cm × 1.5 mm, basifixed; style 5–6 cm long, gradually broadening to the capitate stigma, densely pubescent along the entire length with simple uniseriate trichomes less than 0.5 mm long. Fruit not known.

Distribution. In premontane forest in northwestern Ecuador and adjacent Colombia, at (250–) 650–2200 m (Fig. 2).

Markea pilosa is a most striking plant. It has been identified as a member of the Gesneriaceae due to its occasionally shrubby habit, apparently verticillate leaves, and large, showy, fleshy flowers. It is most similar to *M. antioquiensis* of northwestern Colombia (see above), but differs from that species in its densely pubescent leaves, trichomes 1–4 mm long composed of 4–6 cells, densely pubescent style, and somewhat longer filaments. The large, membranous calyx lobes are like those of *M. antioquiensis*, but the prominent venation on the calyx of *M. pilosa* is reminiscent of the calyx of *M. longiflora* Miers of the Amazon basin (see Knapp et al., 1997 [as *M. camponoti* Ducke]).

Label data indicate that *M. pilosa* often grows as a free-standing shrub in the forest understory. However, *Palacios et al. 9808* state that when the plant is taller it is attached to trees by adventitious roots (“Arbusto hasta 80 cm de alto o hasta 2 m de largo, pero en este caso con las raíces adheridas a algún tronco”). It is possible that many of the collections of *M. pilosa* are of plants that have not yet attained the epiphytic habit.

Markea pilosa clearly exhibits some polymorphism in flower color (see Fig. 3), with most collections stating that the flowers are reddish or purple (*Tipaz et al. 1907*, *Dodson & Gentry 17640*, *Méndez et al. 376*, *Dodson et al. 19101*), while others state that the flowers are greenish or brown (“café”) (*Rubio et al. 1082*, *1186*, *Acevedo & Daly 1676*). Flower color is noted as being “verde clara pero ligeramente violacea en la garganta por den-

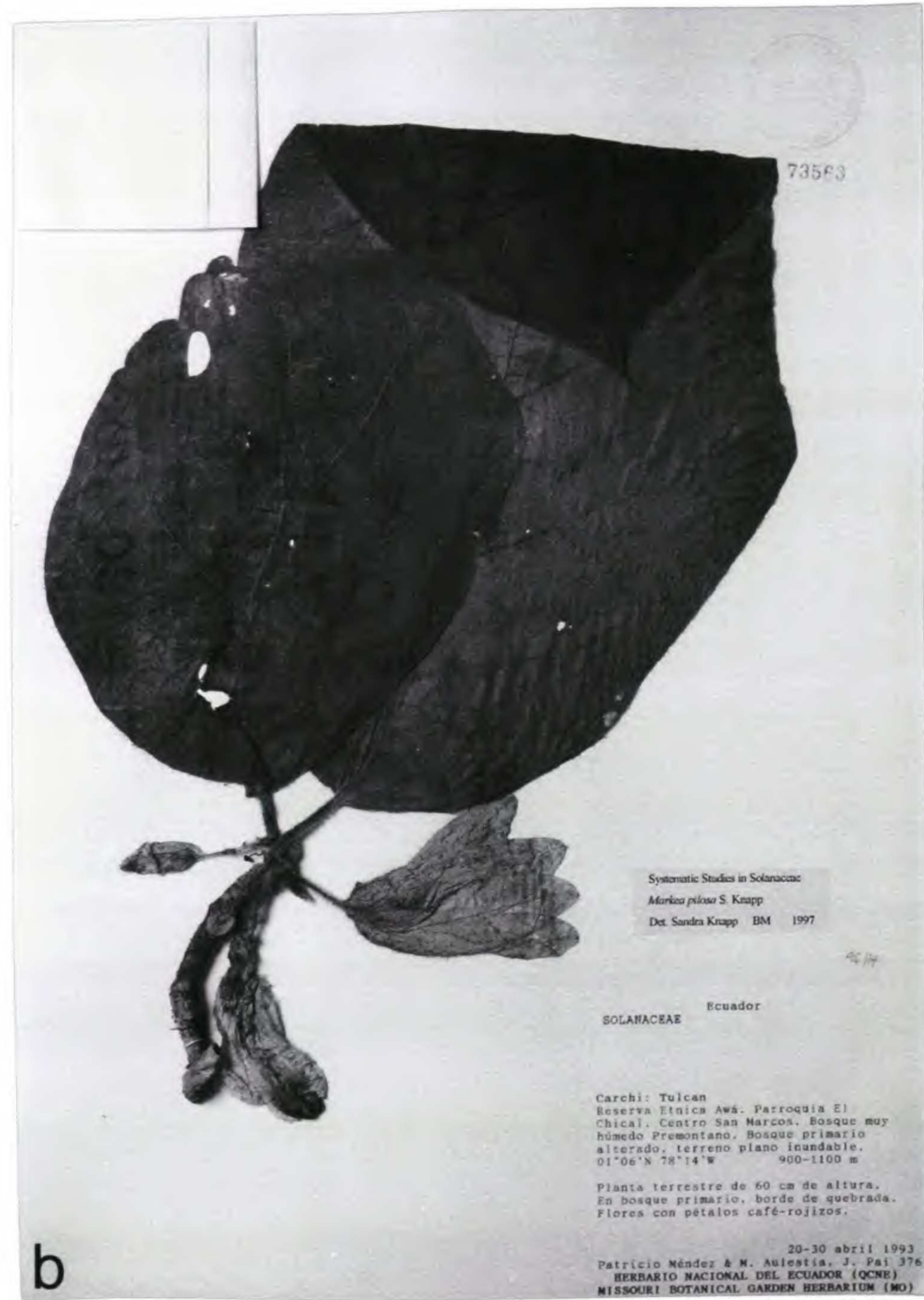
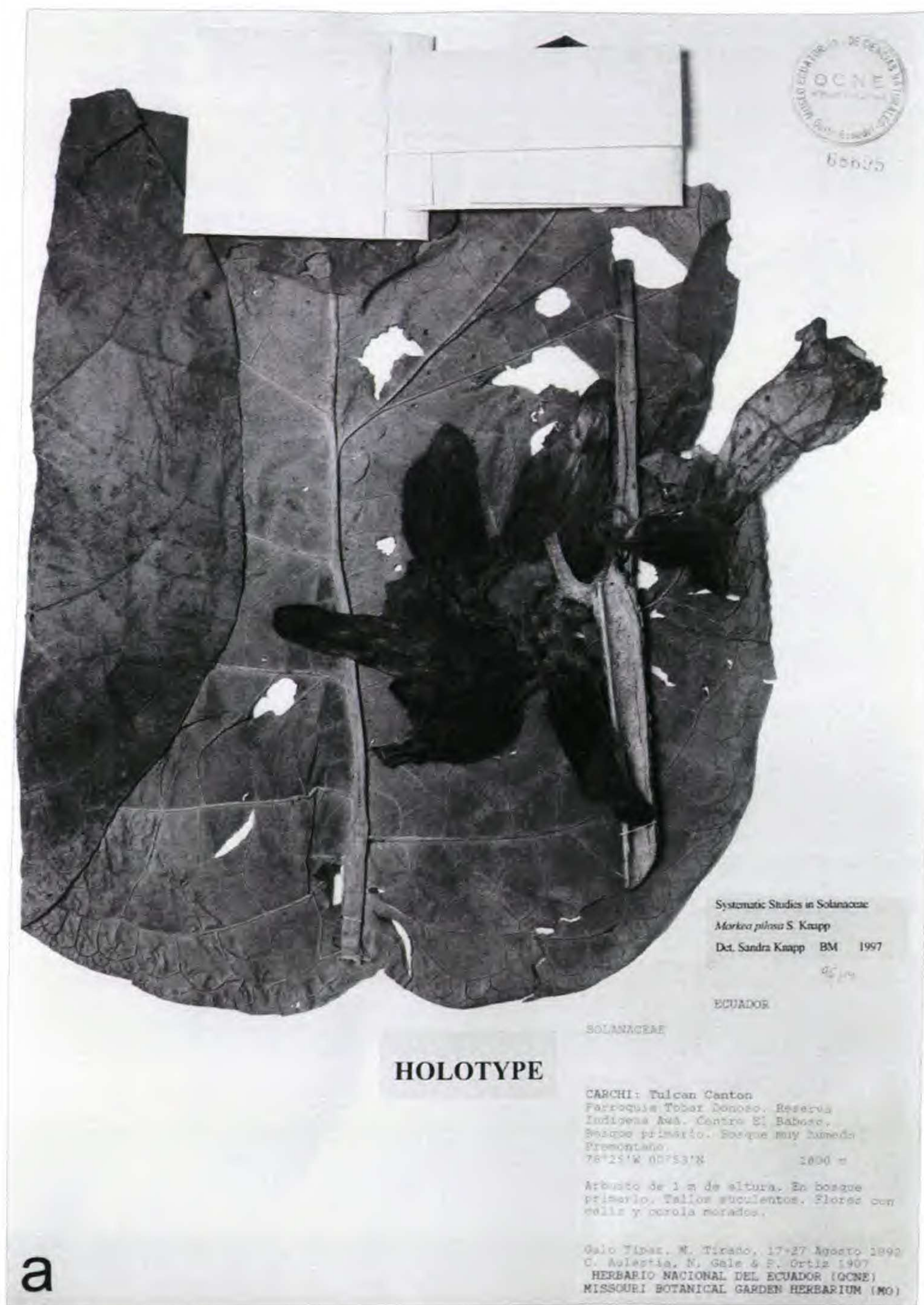


Figure 4. *Markea pilosa* S. Knapp.—a. Holotype, *Tipaz et al.* 1907 (QCNE).—b. *Méndez et al.* 376 (QCNE).

tro" on *Palacios et al.* 9808. Color polymorphisms are common in the Solanaceae (see Knapp & Helgason, 1997), particularly between purple and white or green.

The epithet refers to the striking dense pubescence of the leaves and inflorescences.

Paratypes. COLOMBIA. **Valle:** Vereda de Chicoral Alto, detrás de Dapa, en los nacimientos del Río Bitaco, vert. Pacífico, 2000 m, 13 Jan. 1990, *Ramos* 2388 (MO). ECUADOR. **Carchi:** trail from Rafael Quindí's house to his mountain finca, 0°52'N, 78°08'W, 1890 m, 28 Nov. 1987, *Hoover & Wormley* 1912 (MO); ridge to NE of Rafael Quindí's mountain finca, 2000 m, 0°52'N, 78°08'W, 29 Nov. 1987, *Hoover* 2006 (MO); Reserva étnica Awá, Parroquia El Chical, Centro San Marcos, 900–1100 m, 1°06'N, 78°14'W, 20–30 Apr. 1993, *Méndez et al.* 376 (QCNE); Canton Mira, N de Carmen, camino a Chical, 2000–2200 m, 0°17'N, 78°13'W, 10 Feb. 1992, *Palacios et al.* 9808 (QCNE); Canton Tulcan, Parroquia Maldonado, Reserva Indígena Awá, comunidad San Marcos, 25 km al NW de El Chical, 1500 m, 1°06'N, 78°14'W, 16–30 Nov. 1990, *Rubio et al.* 951 (MO), *Rubio et al.* 1082 (MO, QCNE). **Esmeraldas:** Mun. de Lita, road from Lita to San Lorenzo, 10 km N of Lita, ca. 650 m, 11 May 1987, *Acvedo & Daly* 1676 (NY); Cristal, km 12 Lita to Buenos Aires, off road from Lita to San Lorenzo, 1400 m, 20 July 1988, *Dodson & Gentry* 17640 (QCNE); road Lita to San Lorenzo, km 18, 800 m, *Dodson et al.* 19101 (QCNE).

Markea spruceana Hunziker, *Kurtziana* 25: 99. 1997. TYPE: Ecuador. Pichincha: road Nononanal, Río Alambí, km 43–45, 2200–2500 m, 7 June 1967, *Sparre* 15992 (holotype, S). Figure 5a, b.

Epiphytic shrub, branches to 3 m long; stems with the bark reddish, shiny and papery even on very young stems. Leaves apparently verticillate in whorls of 3–6, elliptic to obovate, 7–20 × 15–30 cm, glabrous on both surfaces; major veins 8–10 pairs, drying yellow; base attenuate; apex acute; petiole 2–5 cm, glabrous or with a few tiny simple uniseriate trichomes. Inflorescence an axillary raceme-like cyme, simple, 6–12 cm long, usually bearing a solitary flower, but with the scars of ca. 4 more, glabrous. Buds not known. Flowers with the calyx lobes valvate in bud, the sutures winged onto the pedicel, divided 1/3–1/2 way to the base at anthesis, the lobes lanceolate, membranous with prominent venation, the tips rounded, the margins ciliate or glabrous; pedicel 0.5–1 cm, glabrous or minutely pubescent with simple, uniseriate trichomes, the apex winged from the expanded calyx lobe sutures; corolla 7–12 cm long, tubular funnelform, abruptly widening ca. 1 cm from the constricted base, dark purple or greenish, the tube 6–9 cm, the lobes 5, 1–3 × 1–3 cm, glabrous except for a few simple trichomes along the veins; filaments 1.5–2 cm long, inserted ca. 1 cm from the

base of the corolla tube, glabrous at point of insertion; anthers 1–1.5 cm long, basifixed, dehiscent by longitudinal slits; style 3–4 cm long, glabrous, the stigma clavate. Fruit an ellipsoid berry, green, ca. 1.2 × 2.5 cm, translucent when dry, appearing slightly winged at the apex; seeds ca. 50, ca. 3 × 2 mm, bright orange, the surfaces with deep rectangular pits, the hilum at one end.

Distribution. On the western slopes of the Andes in Ecuador, in premontane forest from 650 to 2200 m (Fig. 2).

Markea spruceana was recognized as a potentially new taxon distinct from *M. lopezii* by Hunziker (1985). I had intended to describe it as new, but the recently published study of the species of *Markea* by Hunziker (1997) makes that unnecessary. There are still very few collections of this species, and Hunziker (1997) had not seen any fruiting material when he described the species as new. *Markea spruceana* is quite similar in flower morphology to *M. pilosa*, also from the western Andean slope, but differs in its glabrous filament bases, smaller and less translucent calyx lobes, and the general lack of pubescence on the inflorescence and floral parts. The leaves of these two species are quite distinct; those of *M. pilosa* are always pubescent at least on the upper surface and are cordate or truncate at the base, while those of *M. spruceana* are glabrous and only occasionally bear a few trichomes along the veins and are attenuate at the base with the basal pair of primary veins running almost parallel to the midrib in the lower half of the leaf. The fruit, not seen by Hunziker (1997), clearly suggests that this species is a member of the genus *Markea* s. str., as the translucent berry wall and orange seeds are shared with other species of the group (see Knapp et al., 1997).

The first collection of *M. spruceana* was collected in the *Cinchona* forests of Ecuador as Spruce traveled from Guaranda to the Río Ventanas in search of plants of valuable medicinal barks for the government of British India (Spruce, 1908). In 1859, Spruce was commissioned by the British Government of the time to procure seeds and plants of the "Red bark tree" for use as anti-malarials in the tropical colonies, most notably India. Spruce spent the year 1860 working to collect this material, but once established and sent on to India the trees languished and died, probably due to the unsuitable habitat in which they were grown there (see A. R. Wallace's comments in Spruce, 1908). The label on

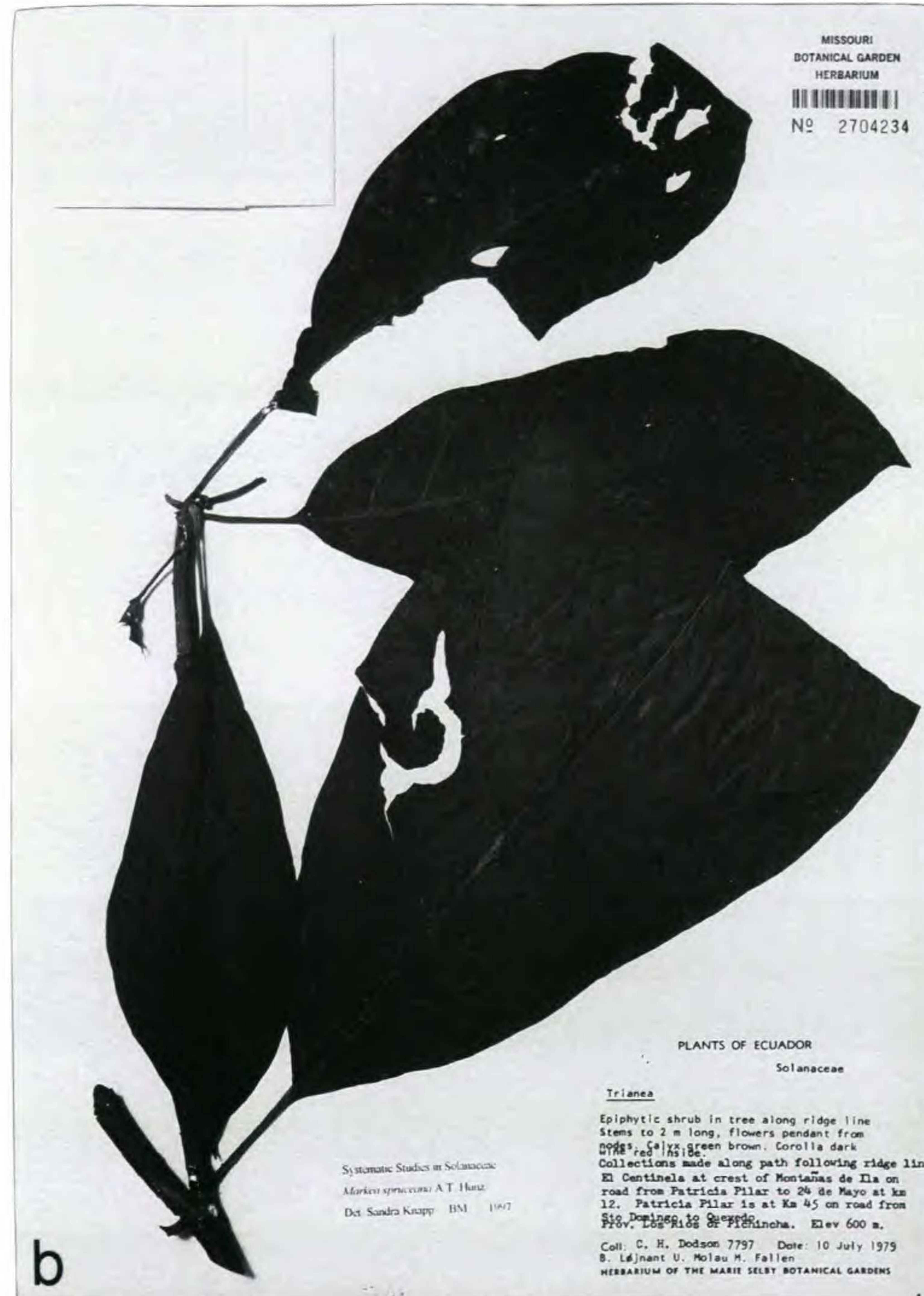
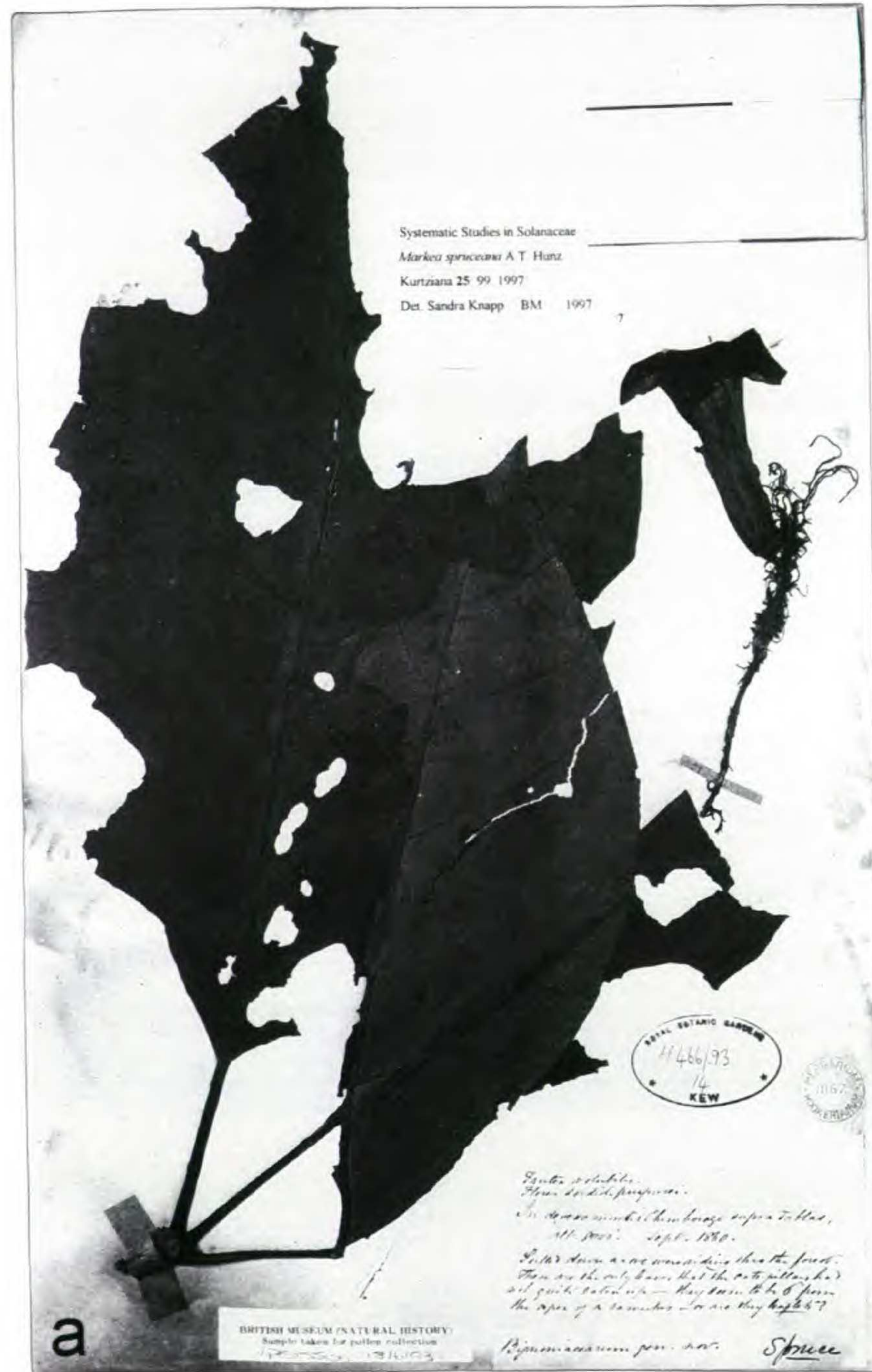


Figure 5. *Markea spruceana* Hunziker.—a. *Spruce s.n.* (K).—b. Characteristic “C”-shaped damage by larvae of ithomiine butterflies, *Dodson et al.* 7797 (MO).

the specimen (see Fig. 4a) states "Pulled down as we were riding thro the forest. These are the only leaves that the caterpillars had not quite eaten up—they seem to be 6 from the apex of a ramulus—or are they *leaflets*?" The specimen was probably collected sometime between 12 and 23 September, at the end of Spruce's time in the area when he did not collect generally, as his helpers could "hardly be spared for any other service" other than preparing the *Cinchona* seedlings. I have seen no duplicates of this collection, unusual for Spruce, who normally collected in relatively large sets. Duplicates may eventually be found filed with the Bignoniaceae, as Spruce thought this plant represented a new genus in that family.

The caterpillar damage on Spruce's specimen and very evident on *Dodson et al.* 7797 (Fig. 4) is characteristic of ithomiine butterflies (Lepidoptera: Nymphalidae: Ithomiinae) of the genus *Melinaea* (tribe Melinaeini). *Melinaea* and its less common relative *Olyras* are specialist feeders on epiphytic Solanaceae (Drummond & Brown, 1987) and have been reared on several genera in the solanaceous tribe Juanulloeae to which *Markea* belongs. Both *Olyras* and *Melinaea* potentially occur on the western Andean slopes in Ecuador, and either of these host-specific herbivores could be feeding on *M. sprucei*. Larvae of *Olyras* have not been collected in the wild, so their natural host plants are not definitely known.

Additional specimens examined. Sin loc.: "western slopes of the Andes, 0°–40°, 1861–1863," *Pearce s.n.* (BM). ECUADOR. **Bolívar:** "in devexo montis Chimborazo, supra Tablas, 8000', Sept. 1860," *Spruce s.n.* (K). **Pichincha:** El Centinela at crest of Montañas de Ila on road from Patricia Pilar to 24 de mayo, km 12 (Patricia is at km 45 of Santo Domingo–Quevedo road), 600 m, 10 July 1979, *Dodson et al.* 7797 (MO); Centinela, km 12 carretera Patricia Pilar–24 de Mayo, altura de km 47 Santo Domingo–Quevedo, la cima de las Montanas de Ila, 650 m, 26 July 1984, *Dodson et al.* 14496 (MO, NY, QCNE); Reserva Forestal ENDESA, Río Silanche, km 113 Quito–Pto. Quito, faldas occidentales, 10 km N de la carretara

principal, 0°05'N, 79°02'W, 650–700 m, 26 May 1984, *Jaramillo* 6623 (MO).

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